WORKFORCE TRAINING

Supply, Demand, and Gaps

2000

Washington State
Workforce Training
and Education
Coordinating Board

WORKFORCE TRAINING AND EDUCATION COORDINATING BOARD

The Vision

The Workforce Training and Education Coordinating Board is Washington State's valued and trusted source of leadership for the workforce training and education system.

Mission Statement

The Workforce Training and Education Coordinating Board's mission is to bring business, labor, and the public sector together to shape strategies to best meet the state and local workforce and employer needs of Washington in order to create and sustain a high skill, high wage economy.

To fulfill this Mission, Board members, with the support of staff, work together to:

- Advise the Governor and Legislature on workforce development policy.
- Promote a system of workforce development that responds to the lifelong learning needs of the current and future workforce.
- Advocate for the non-baccalaureate training and education needs of workers and employers.
- Facilitate innovations in workforce development policy and practices.
- Ensure system quality and accountability by evaluating results and supporting high standards and continuous improvement.

Board Members

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2. How clear is the information presented in this report?	Not Clear	Somewhat Clear	Very Clear
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Executive Summary

This report identifies the gaps between supply and demand for training in Washington. The Workforce Training and Education Coordinating Board (Workforce Board) prepared this report in response to an assignment in RCW 28C.18.100. Consistent with the Workforce Board's mission, the report emphasizes training for occupations that do not require a bachelor's degree—over three quarters of all jobs.

To assess the supply and demand for training, we consider labor market information and the perspectives of both employers and workers, and separately analyze the needs of three groups:

1. Youth
2. Adults
3. Adults With Barriers to Employment

The following are our major findings and recommendations.

Shortage of Skilled Workers

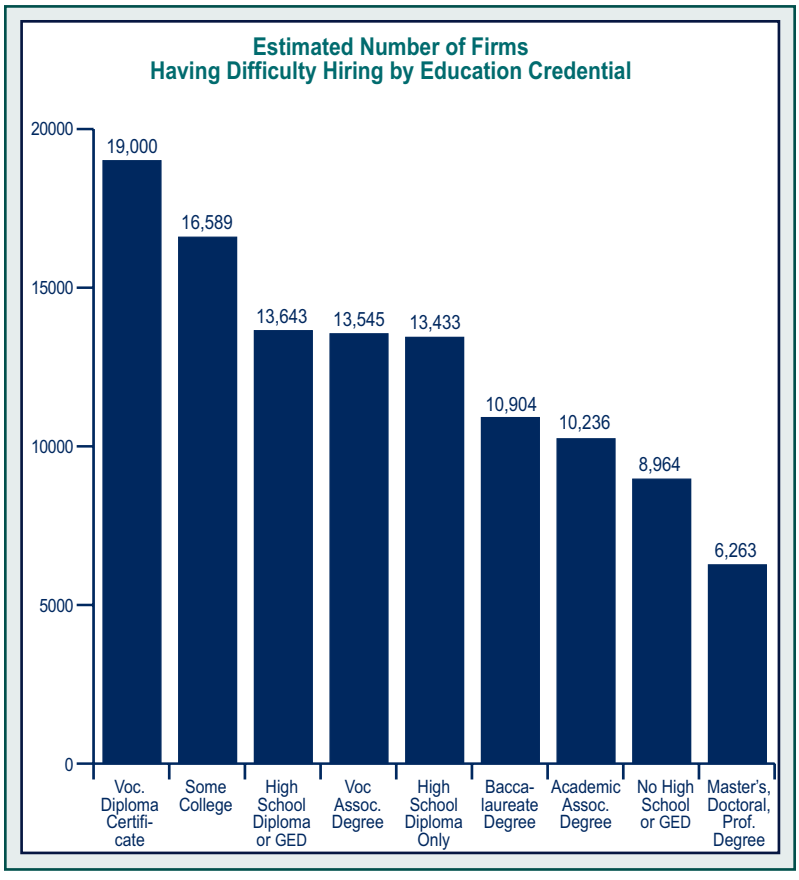
- Sixty-four percent of Washington employers had difficulty finding qualified job applicants during the past twelve months.

- This difficulty is not isolated to high-tech firms; rather, the scarcity of skilled workers affects all industries. Employers in all parts of Washington report difficulty, but the most severe scarcity is in the Puget Sound area.

- The strong economy has created a general labor shortage, and firms even have trouble finding applicants with only a high school credential. The more serious problem, however, is the scarcity of workers with postsecondary training. Among firms having difficulty finding qualified workers, over three quarters report difficulty recruiting workers with bachelor's degrees, vocational certificates, and vocational associate degrees.

- The scarcity of workers with postsecondary *vocational* training affects more firms than are affected by shortages of other workers.

FIGURE 1

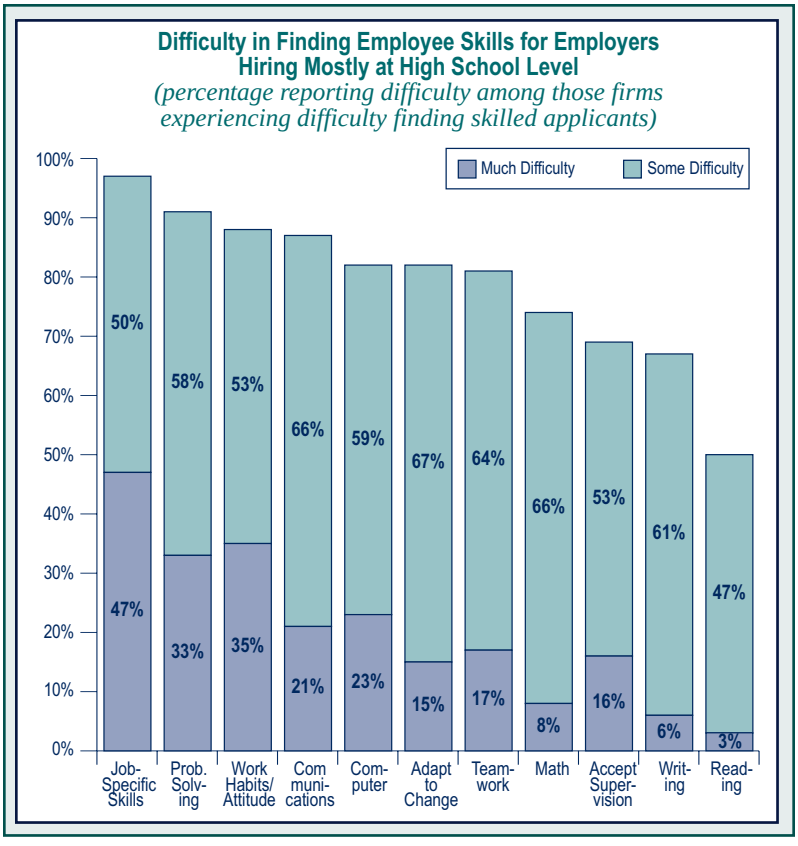


- The scarcity of skilled workers has had severe negative implications for Washington's economy. Employers report that productivity, output, and quality have suffered.

- Pervasive technological change has increased skill requirements. Forty-seven percent of firms report that the skills required to adequately perform production or support jobs have increased during the past three years. One reason is that computer usage has become more common.

- Skill requirements will continue to increase. As a result, firms expect their needs for workers with postsecondary training will grow during the next five years. Thirty-six percent of firms expect their needs for workers with vocational diplomas and certificates to increase.

FIGURE 2



Youth

- There remains a sizeable labor market for workers with little or no postsecondary training—this includes workers who have not completed high school, those with a high school diploma, and those with up to but less than one month of postsecondary training. About one-third of projected job openings over the next ten years are in occupations requiring little or no postsecondary training. These lower skill jobs, however, often pay low wages, especially for younger workers.

- Employers who hire workers with only a high school education most frequently report difficulty finding job applicants with job-specific skills, computer skills, and general workplace skills such as the ability to solve problems, good work habits, and communication skills. They report having less difficulty finding job applicants with basic skills.

- Population growth will increase demand for secondary vocational education, although at a slower rate than during the 1990s. At current participation rates, expected demographic growth will require an additional 7,500 Full-Time Equivalent Students (FTE) in secondary vocational-technical education by 2004-05.

Adults

- Together community and technical colleges, private career schools, and apprenticeship programs annually prepare about 22,000 workers with middle-level preparation (postsecondary training lasting from 1 year and up to, but less than, 4 years). When we compare supply to the number of job openings, we find an annual skills gap of about 8,000 during the 1997-98 school year.

- Simply maintaining the current percentages of adults who enroll in community and technical college programs, private career schools, and apprenticeship programs will not increase the supply of workers with middle-level preparation enough to meet demand. If constant participation rates are maintained, the skills gap would only narrow to around 7,000 by the 2004-05 school year and remain at roughly that level to 2008-09.

- Closing this gap, therefore, requires increasing the number of student FTEs in job preparatory programs at the community and technical colleges beyond current participation rates.

- The amount of increase in job preparatory FTEs depends on the extent to which the community and technical colleges can increase efficiency in training and how soon state policymakers wish to close the skills gap. If there are no efficiency gains, we estimate that to close the skills gap completely by 2008-09 would require adding roughly 2,700 additional job preparatory FTEs per year beginning with the 2001-02 school year.

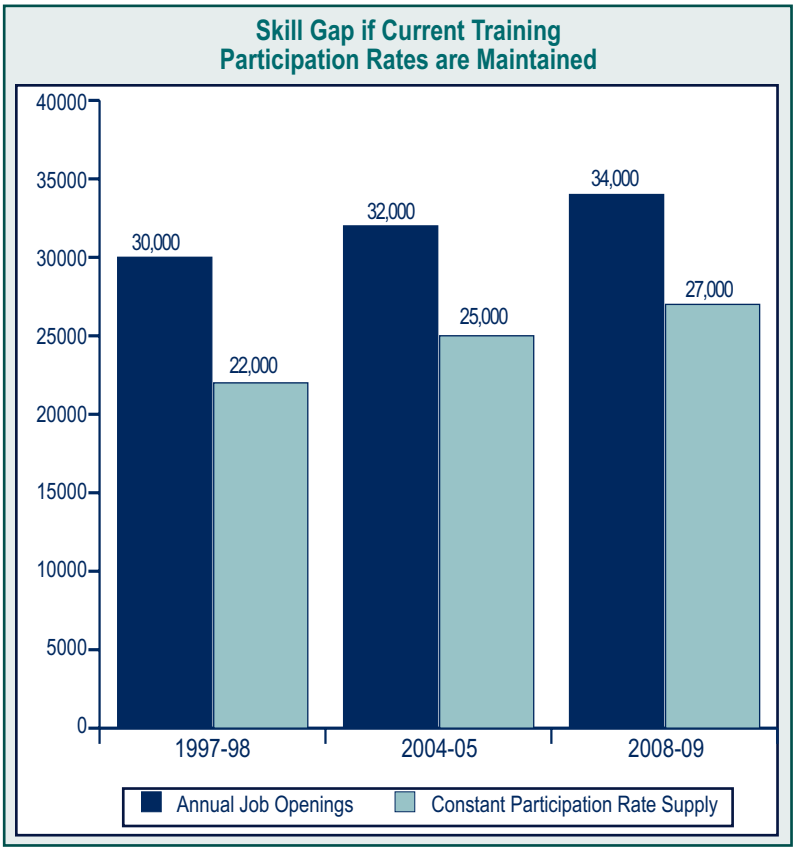
- A 10 percent improvement in efficiency would reduce the number of additional FTEs needed per year in order to close the gap by 2008-09 from 2,700 to 2,000. Efficiency gains increase the rate at which students complete training. For example, colleges are implementing skill standards and certificates that can shorten the time it takes for students to obtain industry-recognized credentials. Tech-Prep and Running Start are increasing the number of college credits obtained by students while they are still in high school. And, K-12 educational reform should reduce the need to allocate college funds to remedial courses.

- Attracting more, and younger, students to vocational programs will be a major factor affecting future growth in enrollments. Policies that increase the incentives for students to enroll in vocational programs, such as special financial assistance, should be considered.

- The Employment Security Department (ESD) estimates that roughly 58,000 workers in Washington were dislocated from their jobs during 1999. Not all of these workers require retraining in order to find new jobs. The dislocated workers that do require training are primarily served by two programs: the Job Training Partnership Act (JTPA) Title III (replaced by the Workforce Investment Act (WIA) Title I-B on July

1, 2000) and the Worker Retraining Program (ESHB 1988). During the period from July 1998 to June 1999, 6,085 dislocated workers enrolled in the JTPA Title III Program and 5,140 enrolled in the Worker Retraining Program.[1] Altogether, a total of almost 9,700 dislocated workers enrolled in one or both of these programs. (This number does not include dislocated workers who were served by other programs such as trade adjustment assistance, or those taking courses at community and technical colleges who were not in the Worker Retraining program.)

FIGURE 3



Adults With Barriers to Employment

- According to the *1998 Washington State Population Survey*, roughly 536,000 people aged 18 to 65, or 15 percent of the state's adults, had household incomes below 175 percent of the poverty line.[2] Of these adults, 20 percent lacked a high school diploma or General Educational Development certificate (GED), and 55 percent had no postsecondary education. A quarter were enrolled in school, and 58 percent were working for pay during the week of the survey.
- According to the State Adult Literacy Survey, between 200,000 and 500,000 adults in Washington are deficient at the most basic skill levels tested. According to the 1990 Census, about 60,000 adults (ages 19-64) in the state report they do not speak English well.
- Programs at community and technical colleges and community-based organizations that report to the Office of Adult Literacy reach over 20,500 students per year with a combination of work-related Adult Basic Education, English-as-a-Second Language, and GED courses, using over 4,800 FTEs per year.
- Only 6 percent of employers provide even 4 hours of basic skills instruction per year to any employees.

[1] These are the numbers enrolling in the programs during this period, rather than the total number of program participants. The number of program participants is greater since participation often lasts for more than one year.

[2] Poverty thresholds vary by household size. The 1998 threshold for a family of 3 was $13,003. The threshold was $16,660 for a family of 4.

Introduction

This is the third analysis of the supply and demand for training in Washington. The Workforce Board, in response to an assignment established in RCW 28C.18.100 assesses the demand for workforce training, the supply of training, and the gaps between supply and demand. The Workforce Board is to administer such assessments every two years. Consistent with the Workforce Board's mission, the analysis focuses on training for jobs that do not require a bachelor degree—over 75 percent of all jobs.

Workforce training is vital to the economic well-being of Washington's workers and businesses. Massive investments in new technologies have increased the demand for highly skilled workers in all sectors of the economy. Supply has not kept up with demand, and the earnings gap between more-educated and less-educated workers has widened dramatically. Sixty-four percent of Washington employers have recently had difficulty finding qualified job applicants, and employers report that skill shortages have lowered productivity, reduced product quality, and limited growth in output and sales.[1]

Methods

The report draws upon recent state surveys conducted for Workforce Board; the 1998 Washington State Population Survey adminstered by the Office of Financial Management; the 1990 Census; Employment Security Department projections; the State Adult Literacy Survey; and management information from the Employment Security Department, the State Board for Community and Technical Colleges, the Office of Superintendent of Public Instruction, the Higher Education Coordinating Board, and the Office of Financial Management. Approximately 4,000 (37 percent of the sample) firms responded to the Workforce Board's employer survey conducted in the fall of 1999. The responses have been weighted so that the percentages reported here reflect the actual population of employers in the state. (Firms employing fewer than two workers and federal employers were not surveyed.) The projections of higher education participation rates and policy changes have been developed in cooperation with the Office of Financial Management.

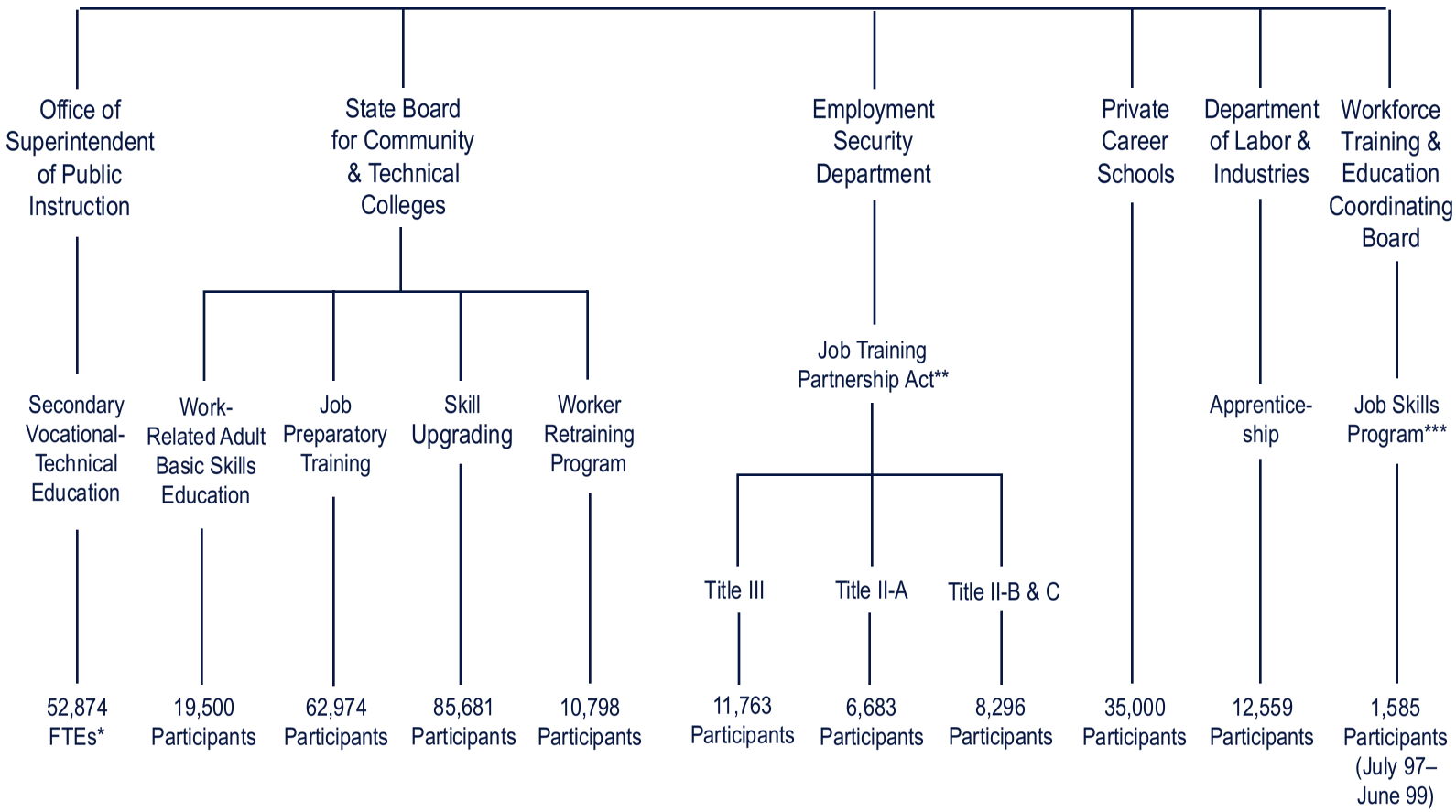
Overview of Supply

The figure on page 2 illustrates the major components of the workforce training system that are analyzed in this report and the approximate number of participants during the 1998-99 school or program year. State and federal appropriations for these programs totaled approximately $627 million.

[1] Workforce Board's employer survey, *Workforce Training Needs and Practices of Washington State Employers*, 1999.

Workforce Training and Education Programs

1998–99 Participation



* Student FTEs and participant headcounts are not comparable.

** This report is based upon Job Training Partnership Act (JTPA) programs in place during 1998-99. On July 1, 2000, the Workforce Investment Act replaced JTPA.

*** The administration of the Job Skills Program was transferred from the Workforce Board to the State Board for Community and Technical Colleges in July 1999. The figure for this program refers to the number of participants from July 1997 to June 1999.

The Shortage of Skilled Workers

The Workforce Board's employer survey, *Workforce Training Needs and Practices of Washington State Employers 1999*, found most Washington employers had difficulty finding qualified job applicants during the past 12 months. The types of skills employers most frequently had difficulty finding were job-specific and general workplace skills. Employers reported difficulty finding workers with vocational skills normally obtained at community and technical colleges and private career schools. According to employers, the shortage of skilled labor lowered productivity and reduced production or sales.

The survey, conducted from July through September 1999, was mailed statewide to 10,739 employers. The Association of Washington Businesses assisted with outreach to employers. A total of 3,966 employers responded, yielding a response rate of 37 percent. (This is a substantial improvement over the 11 percent response to our 1997 survey of employers.)

The responses were weighted to make the results representative of all employers in the state with two or more employees covered by unemployment insurance as reported to the state Employment Security Department. Federal employers and firms with less than two employees are excluded.

Skill Quality of Job Applicants

Among firms looking for workers during the last 12 months, *64 percent* reported difficulty finding qualified applicants.[1] This represents an estimated 60,750 Washington State employers. While the problem affects firms of all sizes, larger firms are more likely to report difficulty. (See Figure 1.)

The difficulty is not isolated to high-tech firms; rather the scarcity of skilled workers affects all industries. Employers in all parts

[1] This includes firms that hired new employees or that did not hire because of difficulty finding qualified applicants (i.e., that did not hire but reported difficulty).

FIGURE 1

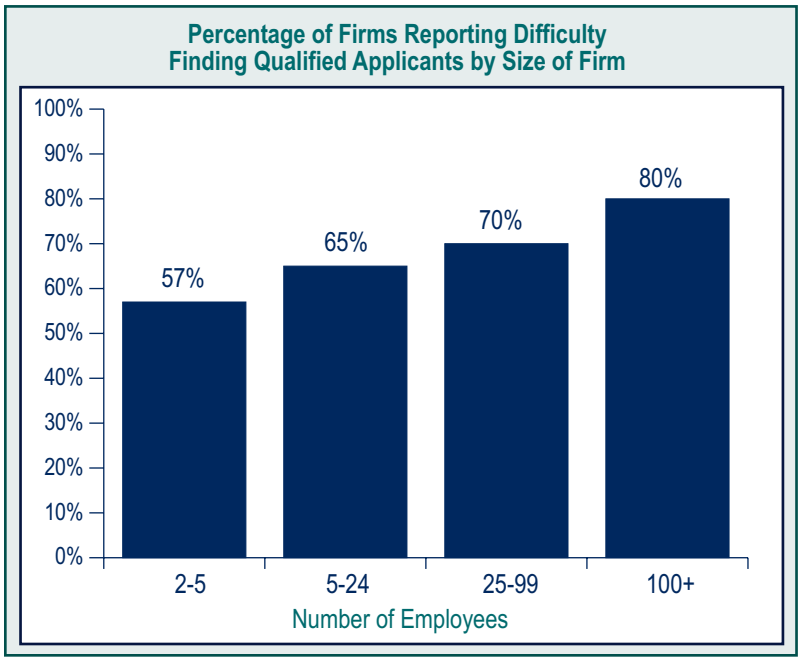


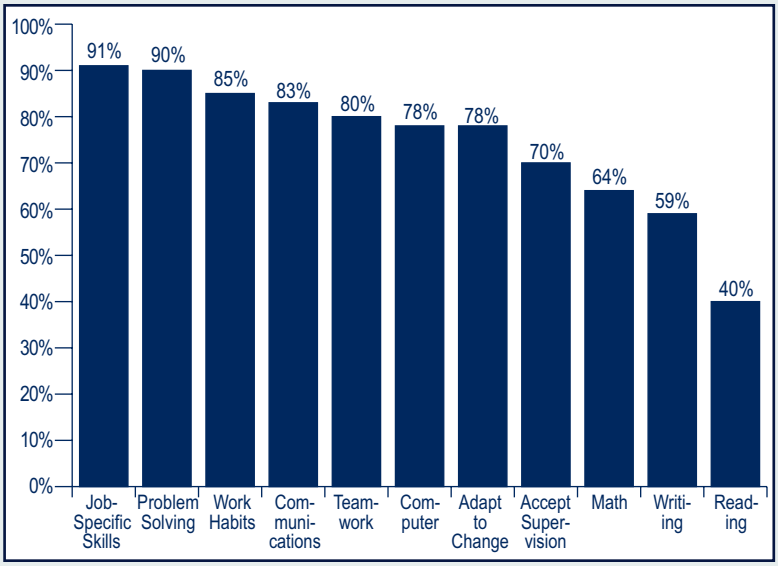
FIGURE 2

Percentage of Firms Reporting Difficulty Finding Qualified Applicants

INDUSTRY	REGION			
	Statewide	Puget Sound[2]	Western Balance[3]	Eastern Washington
All Firms	64	69	59	57
Agriculture and Food	46	64	53	34
Manufacturing	70	73	67	64
Construction	73	80	65	67
Trade	65	68	62	60
Services	65	70	59	60
High-Tech[4]	63	66	46	71
Other[5]	57	60	48	59

FIGURE 3

Percentage of Employers Having Difficulty Finding Qualified Applicants With Specific Skills
(among employers reporting difficulty in the last 12 months)



of Washington report difficulty, but the most severe scarcity is in the Puget Sound's booming economy. (See Figure 2.)

Employers were asked to rate their satisfaction with applicants' skills in three general areas:

1. Job-specific (occupational) skills.

2. Workplace skills (the ability to communicate with coworkers, follow directions, adapt to changes, good work habits, and attitudes).

3. Basic skills (reading, writing, and math).

The most commonly cited problem among the firms reporting having difficulty was finding applicants with required job-specific skills. Firms also have difficulty in finding applicants with problem-solving skills, positive work habits, communication and teamwork skills. (See Figure 3.) These are much the same relative areas of difficulty found in our 1997 employer survey.

[2] The Puget Sound region includes Snohomish, King, and Pierce counties.

[3] The Western Balance includes Island, San Juan, Skagit, Whatcom, Clallam, Jefferson, Kitsap, Grays Harbor, Lewis, Mason, Pacific, Thurston, Clark, Cowlitz, Skamania, and Wahkiakum counties.

[4] High-tech includes biotechnology; computers and computer equipment; computer programming, software, and maintenance; electronics; precision equipment and instruments; telephone communications; and research and testing.

[5] Other (not elsewhere classified) includes transportation and public utitilities, communication, gas, electric and sanitary services, finance, insurance, real estate, and public administration.

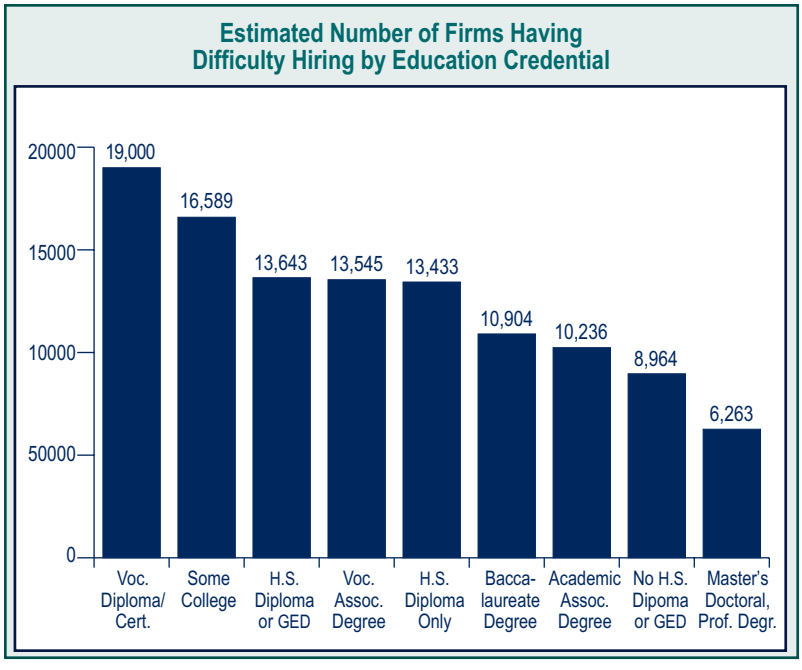
Shortage of Job Applicants With Postsecondary Vocational Training

The Workforce Board asked employers about their difficulty in finding qualified applicants with the formal education required to fill job openings. The strong economy has created a general labor shortage, and firms even have trouble finding applicants with only a high school credential. The more serious problem, however, is the scarcity of workers with postsecondary training, as opposed to a general shortage of laborers. The scarcity of workers with postsecondary *vocational* training affects more firms than are affected by shortages of other workers—19,000 firms had difficulty finding workers with a vocational diploma or certificate, and 13,545 had difficulty finding workers with a vocational associate degree. When duplicate counts of firms are removed, we estimated 24,000 firms have difficulty finding applicants with either vocational certificates or vocational associate degrees. (See Figure 4.)

We asked employers what occupation was the most difficult to find qualified job applicants for. Below are the 10 occupations most frequently reported by employers with examples of jobs in each field. Many of these jobs require vocational training.

1. **Sales** *(Retail Sales, Sales Representatives)*
2. **Cook, Chef, Food Service Worker**
3. **Laborer** *(Warehouse Worker)*
4. **Administrative Secretary** *(Secretary, Legal Secretary, Medical Secretary)*
5. (tie) **Personal Health Care Worker** *(Registered Nurse, Nursing Assistant)*
6. (tie**) Driver** *(Local Driver, Long-haul Driver)*
7. **Carpenter**
8. **Mechanic** *(Automotive, Heating-Cooling Systems, Truck and Heavy Equipment)*
9. **Construction Worker**
10. **Computer Technician** *(Computer Service Technician, Computer Network Administrator, Computer Systems Analyst)*

FIGURE 4

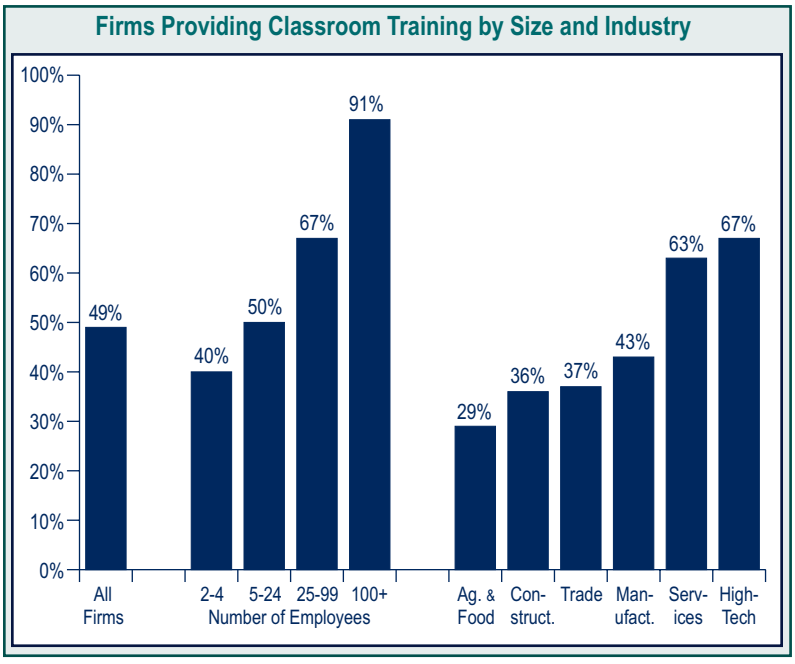


Impact of the Shortage of Skilled Labor

The scarcity of skilled labor has limited the state's economic development, and it has had severe impacts on Washington's firms. Among firms having difficulty finding qualified applicants:

- 74 percent (an estimated 41,600 firms) reported lowered productivity.
- 67 percent reported reduced output or sales.
- 64 percent reported quality suffered.
- 32 percent reported that the scarcity prevented expansion of facilities.

FIGURE 5



Employer-Provided Training[6]

One response to the shortage of skilled labor is for employers themselves to provide training. The survey found almost half of all firms do provide or pay for some classroom training. Large firms are more likely to do so than are small ones, and high-tech and service sector firms are especially likely to provide classroom training. (See Figure 5.)

There are three broad categories of classroom training—training in workplace practices, basic skills training, and training in job-specific skills. Employers tended to concentrate their training investments on improving employees' job-specific skills (i.e., training to upgrade employee skills, extend employee skills, or to qualify workers for specific occupations). Forty-one percent of firms provided training in job-specific skills. Employers also frequently provided training in workplace practices (i.e., practices that affect employee relations, employee health and safety, and the work environment). Thirty-three percent of firms provided this type of training. In contrast, only 6 percent provide classroom training in basic skills (i.e., reading, writing, math, and English language skills).

[6] For more information on employer-provided training, please see the Workforce Board's *Workforce Training Results—2000*.

Thirty-eight percent of firms report the percentage of their workers who receive classroom training has increased during the past three years. Firms have increased classroom training for a number of reasons—changes in technology and products, the need to improve the quality of output, a desire to promote the career development of employees, and increasing the productivity and flexibility of the workforce are often cited.

Most firms (85 percent) report they provide on-the-job training (OJT). During OJT, a worker learns from someone else the duties that the job requires while performing work. One example is having a coworker teach an employee how to operate a machine. Another is having someone show a new employee the bookkeeping system.

The incidence of classroom and OJT varies by job type. As previous state and national surveys have found, employers are much more likely to provide classroom training to managerial employees than to wage workers. (See Figure 6.) Whereas the incidence of OJT training also varies by occupation, it is more evenly provided across job types than is classroom training.

The Future

Pervasive technological change has increased skill requirements, and the trend is likely to continue. Forty-seven percent of firms report the skills required to adequately perform production or support jobs have increased during the past three years. One reason skill requirements have increased is that computer usage has become more common, even among non-supervisory employees. On average, firms report that 45 percent of nonsupervisory employees use computers in their jobs. Computer use among nonsupervisory workers varies by industry. It is especially high among high-tech firms (89 percent) and service sector firms (56 percent).

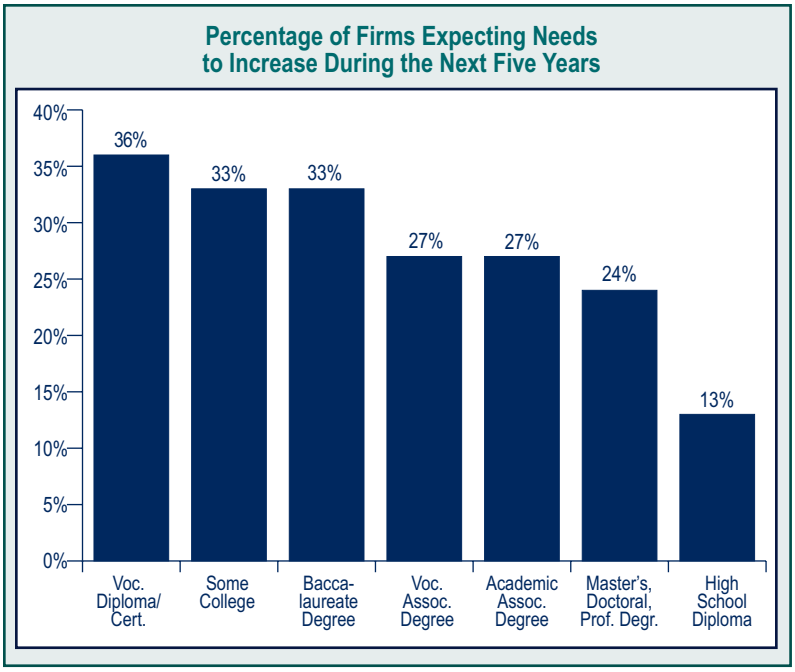
Another factor that increases skill requirements is the adoption of "high-performance work organization" practices. In order to survive in a constantly changing

FIGURE 6

Percentage of Workers Receiving Classroom and On-the-Job Training

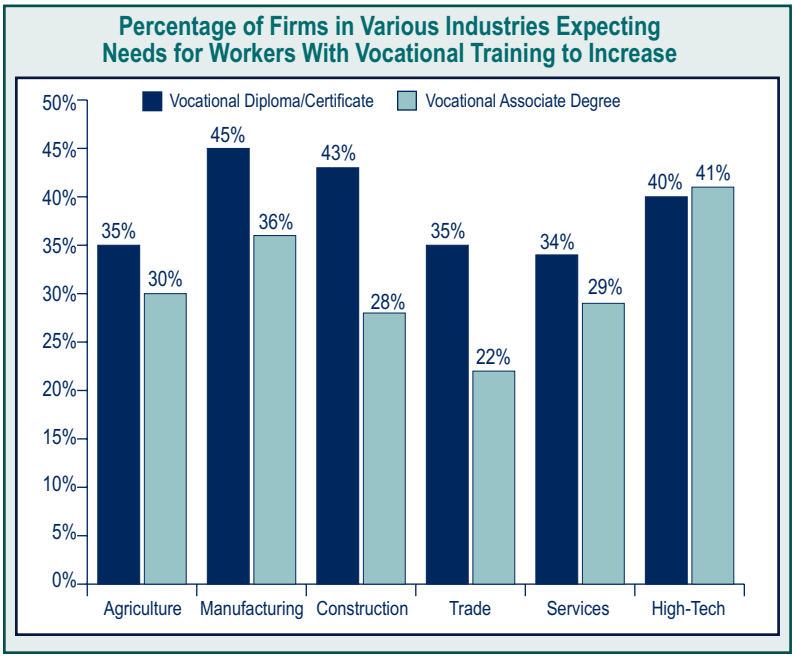
TYPE OF EMPLOYEE	RECEIVING CLASSROOM TRAINING	RECEIVING ON-THE-JOB TRAINING
Managers and Administrators	61%	38%
Professionals	39%	21%
Technical and Paraprofessionals (technicians, programmers, technical support staff)	47%	34%
Marketing and Sales	35%	31%
Clerical and Administrative Support	41%	48%
Service Occupations (protective services, food service, health assisting, cleaning, personal)	28%	32%
Production, Construction, Operation & Maintenance	36%	39%

FIGURE 7



marketplace, firms must pursue a strategy of market flexibility and responsiveness. They must rely on employees who can adjust business processes quickly to move in a new direction. Many Washington businesses are striving to adopt the high-performance strategy. Twenty percent of employers indicated they had a formal continuous quality improvement program in place. Larger percentages are using other high-performance practices such as cross training employees to do a number of jobs (84 percent), self-managed work teams (44 percent), and benchmarking results against other firms (42 percent). The high-performance strategy can only be an option when the employer is either willing to support formal or informal learning on the job or where there is already an adequate supply of skilled workers.

FIGURE 8



Skill requirements will continue to increase, and, as a result, firms expect their needs for workers with postsecondary training will grow during the next five years. (See Figure 7.) Thirty-six percent of firms expect their needs for workers with vocational diplomas and certificates to increase.

The need for workers with postsecondary vocational training is expected to increase in all sectors of the economy. Manufacturing, construction, and high-tech firms are especially likely to report expected increases in demand for these workers. (See Figure 8.) If supply does not increase strongly, the scarcity of skilled workers in these industries could become even more severe.

Youth

The Labor Market

The Employment Security Department has projected annual job openings, due to both growth and replacement, from now through 2008. Overall, there remains a sizeable labor market for workers with little or no postsecondary training. This includes workers who have not completed high school; those with a high school diploma; and those with up to, but less than, one month of postsecondary training. About one-third of projected total openings are in jobs requiring little or no postsecondary training: 46,200 openings each year.

Within the category of jobs that do not require postsecondary training, more jobs are expected in the future to require at least a high school education. While demand for workers without a high school diploma is expected to decline over the next five years, demand for workers with a high school diploma is expected to increase. (See Figure 1.)

Washington employers, due in part to the hot economy, report trouble finding qualified workers with a high school diploma. During the previous 12 months, 27 percent of employers reported such difficulty. The degree of difficulty varies by industry. Firms in the agricultural and trade sectors were most likely to have trouble finding qualified high school graduates. (See Figure 2.)

FIGURE 1

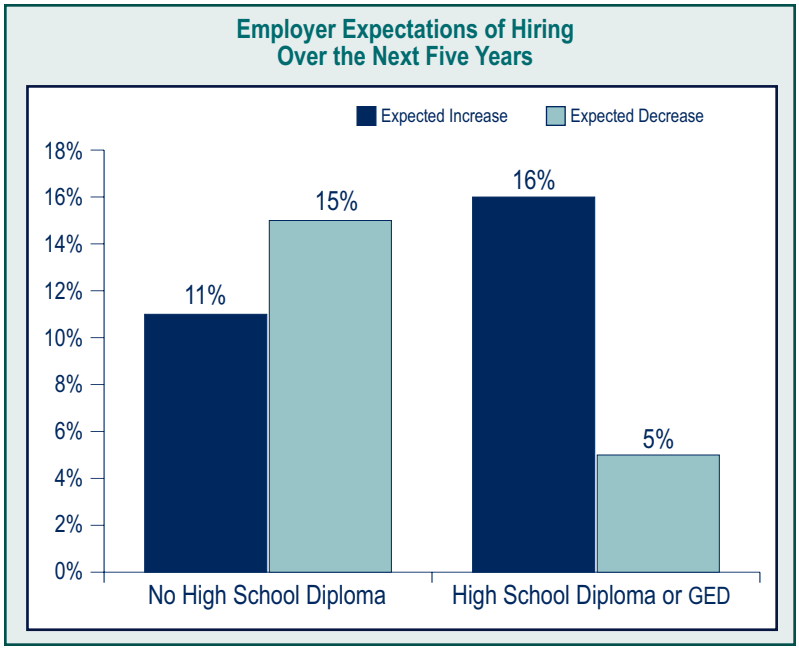
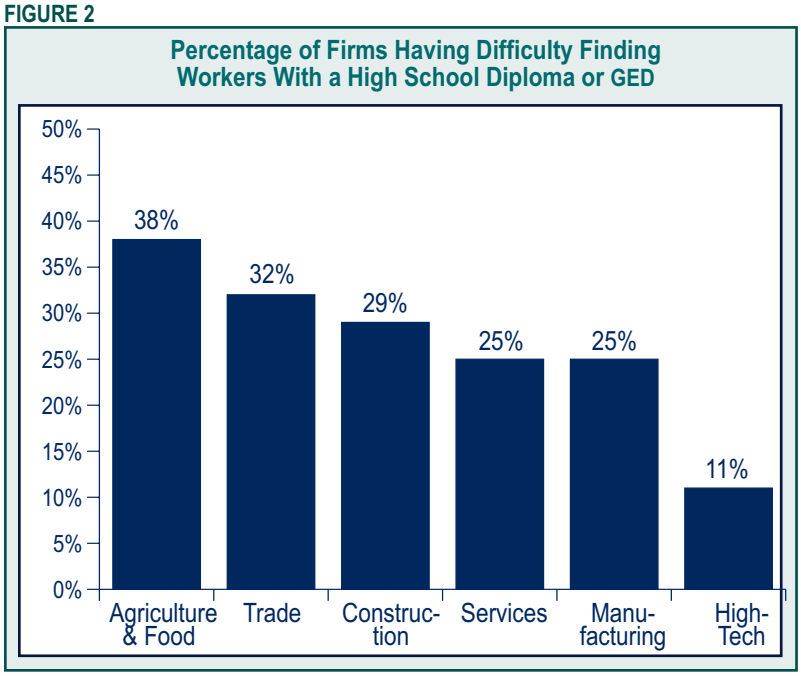


FIGURE 2



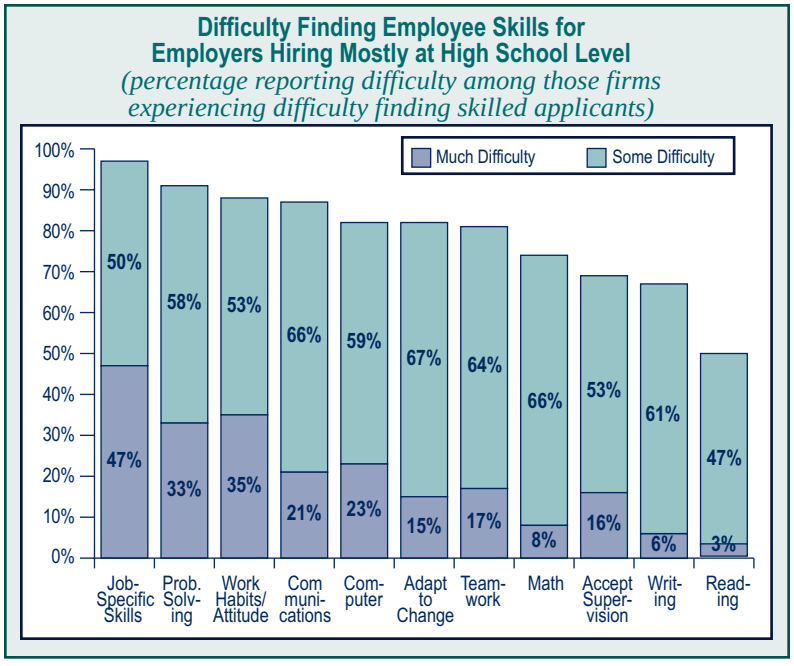
Lower skill jobs are often accompanied by low wages, especially for young workers. Based on a sample of 1997-98 secondary vocational education completers from 109 school districts and 3 skills centers, during the third quarter after high school the median wage was $7.20 per hour.[1] In comparison, the median wage of 1997-98 community or technical college vocational completers was $11.18 per hour.[2] This four-dollar an hour difference suggests the substantial benefits students can obtain by continuing and completing training at the postsecondary level.[3]

[1] Wages are stated in terms of first quarter 1999 dollars.

[2] *Workforce Training Results*—2000, Workforce Board.

[3] This difference is also attributable to the greater work experience and maturity of postsecondary completers.

FIGURE 3



There are, however, many workers who receive and complete their only public occupational preparation in high school. Currently, about one in six workers do not receive any formal education beyond high school during their working career. Close to one-half of the workers who go on to postsecondary education spend at least a year between leaving high school and entering postsecondary education. These facts point to the importance of workforce preparation as part of secondary education.

The basic and vocational skills levels of high school graduates, however, vary considerably. Most high school students who move directly into the workplace do so without receiving significant vocational education in secondary school. Among high school graduates who work full- or part-time after graduation, only 19 percent received vocational training in high school related to their job.[4]

Skill Deficits of High School Graduates

To gain an employer perspective on skill needs for entry-level jobs, we analyzed the survey responses of employers who hire mostly at the high school level.[5] Overall, almost all of these employers reported

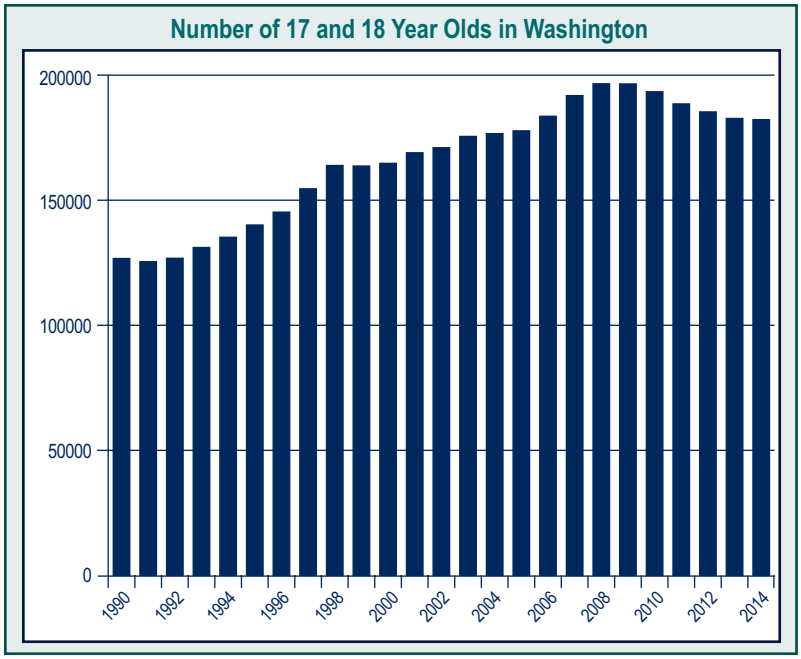
[4] Final report: Governor's Council on School-to-Work Transition, 1995, p. 5.

[5] We use survey responses from only those employers who classified 75 percent or more of their positions as requiring a high school diploma or GED but no postsecondary education or training.

some difficulty finding employees in one or more of the listed skill areas. Most reported high levels of difficulty in at least one skill area. (See Figure 3.)

Taking into consideration bothe the frequency and the intensity of reported difficulty, there were five categories of skills that employers had above average difficulty finding in high school graduates; two were work content-related (job-specific skills and computer skills), and three were general workplace skills (problem solving, work habits and attitudes, and communi-cation). It was less difficult for employers to find applicants with adequate basic skills (reading, writing, and math). While basic skills are critical, they are not the most common skill deficits observed in high school graduate applicants.

FIGURE 4

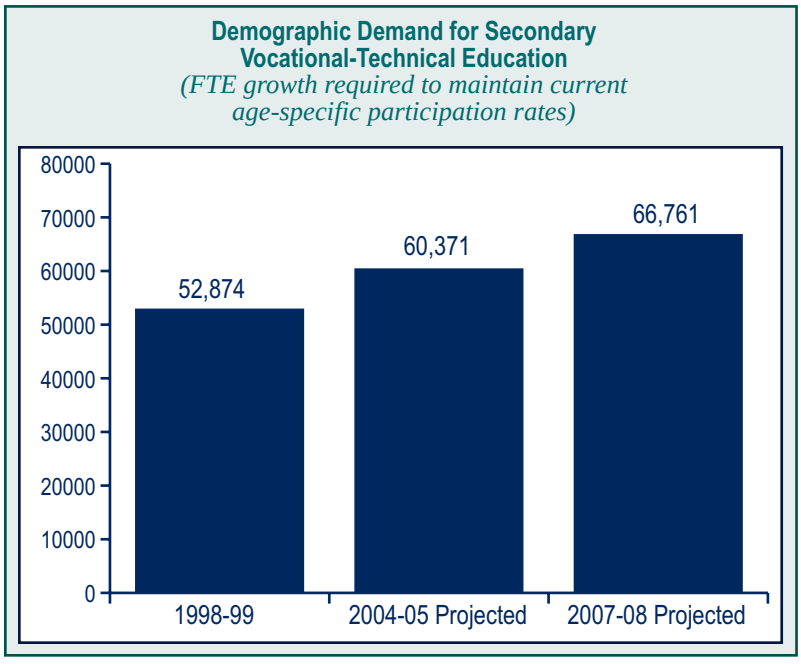


Demographic Growth

Population growth will increase demand for secondary vocational education, although at a slower rate than during the 1990s. The number of 17- and 18-year-olds in the state increased 29 percent between 1992 and 1998. This age group is projected to grow more slowly over the next 5 years, increasing by about 9 percent from 1999 to 2005. The number of 17- and 18-year-olds is expected to peak in 2008. (See Figure 4.)

To maintain current participation rates, expected demographic growth alone will require an additional 7,500 FTEs in secondary vocational-technical education by 2004-05. (See Figure 5.) (Participation rates refer to

FIGURE 5



the percentage of the age cohort who are enrolled in a program.) By 2007-08, an additional 6,400 FTEs would be required.

Out-of-School Programs for Youth

JTPA Titles II-B and II-C targeted youth with barriers to success such as basic skills deficiency or local economic distress. Title II-B provided a mixture of work experience and academic instruction to about 6,000 youth each summer. Title II-C provided year-round services to youth who had dropped out of high school or were at risk of dropping out. It served about 1,800 youth per year, most of whom were still enrolled in high school or in alternative high school programs. On July 1, 2000, the WIA Title I replaced JTPA. WIA Title I authorizes a single grant for youth services, including summer and year-round services.

Adults

Job Preparatory Training, Skills Upgrading, and Dislocated Worker Retraining

The state is not training sufficient numbers of workers for the occupations that require postsecondary vocational skills training.

Overview of Training Supply

Adults obtain postsecondary training in a variety of settings. Most often, they attend community and technical colleges or private career schools or participate in apprenticeship programs, JTPA Title III for dislocated workers, the Job Skills Program (JSP), and training provided by their employers.[1] (Adults with barriers to success such as low socio-economic status qualify for additional training programs, which are discussed in another section.)

Community and technical colleges are the single largest public supplier of adult training in the state. Though community and technical colleges serve purposes other than vocational training (such as providing the first two years of baccalaureate education and basic skills instruction), this section concentrates on college vocational programs and the role of academic associate degrees programs in providing workplace credentials. During 1998-99, there were 62,974 job preparatory students in the colleges who enrolled in order to acquire skills for new jobs.[2] Private career schools also are responsible for training a significant number of students in helping to meet the state's workforce training needs. These schools are private businesses that provide occupational training to students. They enroll approximately 35,000 students per year statewide and grant about 1,255 degrees, primarily associate of arts degrees, each year, as well as over 16,000 vocational certificates.[3]

Apprenticeship in Washington State is governed by the Washington State Apprenticeship and Training Council and administered by the Department of Labor and Industries. Apprenticeship combines classroom studies with extensive on-the-job training under the supervision of a journey-level craft person or trade professional. Apprentices receive wages, health, pension, and other benefits while learning skills. There were approximately 12,559 registered apprentices during 1998-99.

[1] The role of four-year colleges and universities in providing workforce training that does not result in a degree is not well measured. However, there is no doubt that a significant number of individuals receive important workforce training or retraining at four-year institutions without receiving a degree, some without ever intending to receive a degree, and others by continuing their education after having received a degree.

[2] This number excludes international students and students who enrolled only in basic skills classes. There were an additional 85,681 skill upgrade students who enrolled in order to augment skills for current jobs.

[3] This number includes both schools that grant degrees and those that do not. It does not include enrollments at cosmetology schools.

Dislocated worker programs serve workers who are dislocated from their jobs due to economic change. This is most clearly seen in events such as major plant closures, but it also occurs in much less obvious small-scale layoffs and restructurings. Targeted training programs exist for many of these workers. The largest are the federal JTPA Title III program (15,080 participants during program year 1998) and the state Worker Retraining Program (more than 10,700 participants). These programs also provide other services beyond occupational training such as job search and child care assistance. Much, but not all, of the occupational training provided to dislocated workers through JTPA Title III and the Worker Retraining Program consists of community and technical college courses. Private career schools also provide retraining through these programs.

Customized training for specific employers and job openings is funded through the Job Skills Program (JSP). The administration of this program was transferred from the Workforce Board to the State Board for Community and Technical Colleges during 1999. JSP provided training for 1,585 workers from July 1997 to June 1999 with expenditures of $840,988 in state grants. Employers match state expenditures at a rate of at least dollar-for-dollar. The program supports training for new workers and upgrading or retraining for current workers. Training is most often provided by a community or technical college.

Skill upgrading for adults who already have a job is most often provided by employers and not through a public program. Indeed, employers provide a large amount of training to improve the skills of their incumbent workers. According to the Workforce Board's 1999 survey of employers, over 85 percent of employers provide on-the-job training to some of their employees each year. About half of employers provided at least 4 hours of classroom training to at least some of their employees. Community and technical colleges also provide a great deal of skills upgrade training, serving over 85,000 individuals per year.[4]

Demand for Training

There is substantial evidence that employer demand for workers who have completed a postsecondary vocational program is greater than the current supply of these workers. Not only is the workforce growing in size, but the skill requirements for workers within occupations and industries are increasing. In addition, if common predictions of increasing career changes hold true, retraining for career transitions will add significantly to the amount of training needed per worker.

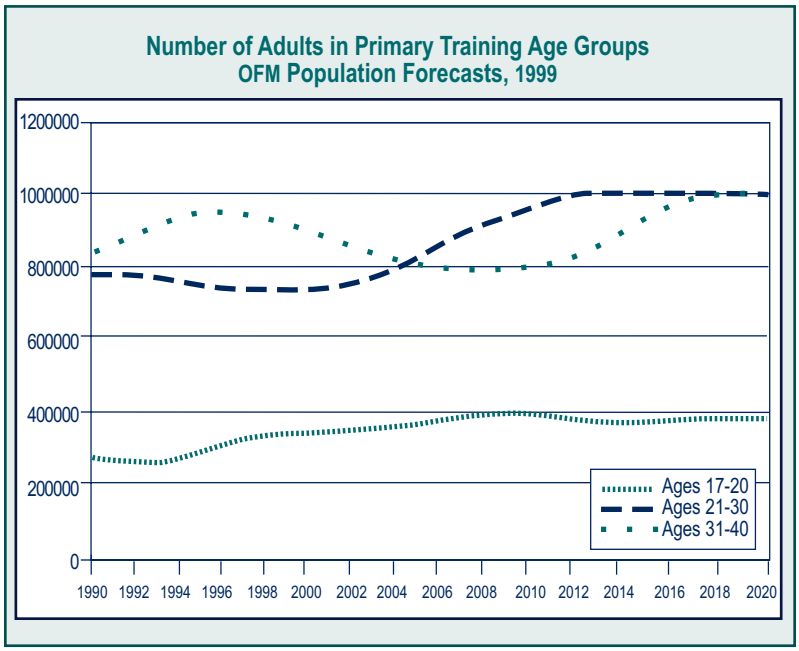
Demographic Growth

The demand for training will increase as the population grows. In analyzing demographic growth, it is important to consider not only the size of the adult population, but its age distribution. Although young adults in their early 20s

[4] Not double counting those included in the job preparatory count.

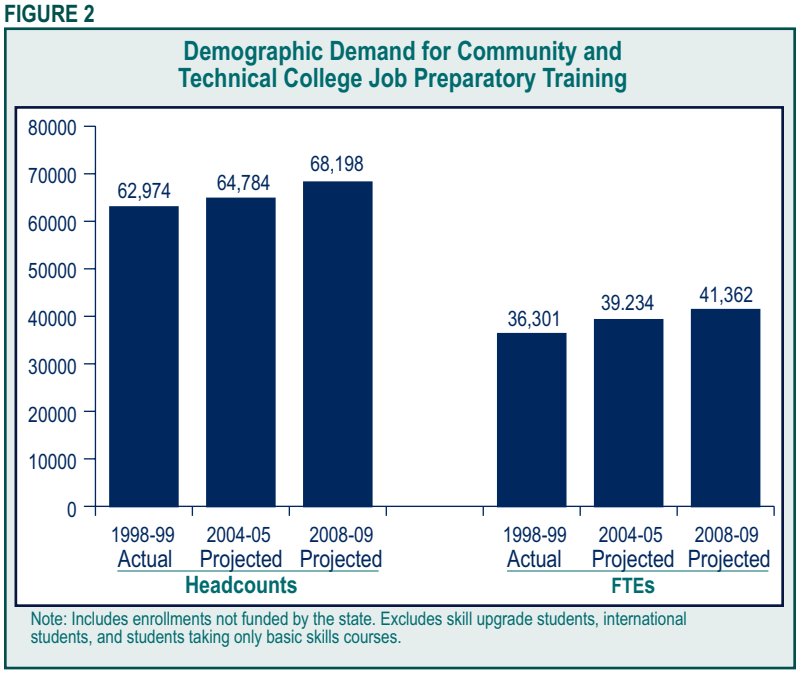
are more likely than older adults to participate in postsecondary vocational training, participation rates for those above 30 years of age remain high as well. The average age of training participants is in the late 20s to early 30s with significantly older participants in dislocated worker programs. Projections show that over the next several years the state's population of 17- to 20-year-olds and 21- to 30-year-olds (the "baby boom echo") will increase rapidly, expanding at a high rate for a period of approximately 10 years before leveling off. As a result, the state's colleges can expect to see an increase in vocational enrollment demand. The decline in the number of 31- to 40-year olds, however, will moderate this increase. (See Figure 1.)

FIGURE 1



Simply maintaining the current percentage of adults in each age group who enroll in community and technical job preparatory training will require some enrollment increases. At recent participation rates for job preparatory students, community and technical college enrollments would have to rise from a headcount of 62,974 in 1998-99 to 64,784 in 2004-05 and to 68,198 in 2008-09 (an 8.3 percent increase over 1998-99).[5, 6] (See Figure 2.)

FIGURE 2



Note: Includes enrollments not funded by the state. Excludes skill upgrade students, international students, and students taking only basic skills courses.

[5] We calculated the age-specific participation rates (head-counts divided by population) and service levels (FTEs divided by population) for four years: 1995-96, 1996-97, 1997-98, and 1998-99. We then calculated the average age-specific rates over the four years, and the projections hold these average age-specific rates fixed.

[6] We focused on job preparatory students since they are preparing for new jobs and add to the labor supply.

Staffing and funding at community and technical colleges is measured in terms of full-time students, known as FTEs.[7] Maintaining recent participation rates by age group would require an additional 2,933 job preparatory program FTEs by 2004-05 and a further 2,128 FTEs by 2008-09 (a 14 percent increase over 1998-99).[8]

For private career schools to maintain current age-specific participation rates, enrollment will have to increase 4.5 percent by 2004-05 and about 11 percent by 2007-08. Similarly, for apprenticeship programs, maintaining current participation rates by age group will require growth of about 3.3 percent by the year 2003-04 and 9.3 percent by 2007-08, compared to 1998-99.

Labor Market Demand

In Washington State, the economy's demand for workers with postsecondary vocational training exceeds the supply being produced by the state's training providers. This gap is evident in data on the projected number of job openings and in employer survey responses.

Economic forecasts indicate substantial and growing demand for workers with vocational credentials. The Washington State Employment Security Department (ESD) projects the educational level associated with job openings expected in the future. To do this, ESD plots employment and net job openings by occupation based on forecast growth for each industrial sector.[9] ESD then identifies the educational level expected of employees filling these openings by using the Bureau of Labor Statistics (BLS) skill-level classifications. The most recent projections forecast annual openings from 1998 to 2008.

BLS has recently changed its skill-level classifications. Previously, the Bureau classified occupations into 4 training categories; it now uses 11.[10] The Workforce

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[7] Measuring enrollment in FTEs is particularly important for programs where many students attend part-time. An FTE is the amount of courses that a student attending full-time requires, i.e., two half-time students are counted as one FTE.

[8] The Workforce Board employs a somewhat different approach from the Office of Financial Management's annual forecast used in calculating the Higher Education Coordinating Board forecast. The Workforce Board's projections include *all* enrollments, not just the 91 percent of enrollment funded by the state. The Workforce Board uses this approach in order to calculate the total supply of vocational training. These figures include only job preparatory students. Skills upgrade students, international students, and students taking only basic skills classes are not included. The participation rate projections in this report have been developed in cooperation with the Office of Financial Management and are compatible with its participation rate projections.

[9] The net job openings forecast adjusts for normal changing of jobs within an occupation and counts only openings that result from growth in the number of jobs or from separations such as retirement in which a worker leaves a particular occupational category.

[10] The old categories were: (1) bachelor, professional, or graduate degree; (2) two or three years of postsecondary education, training, or specific experience, or a two- to four-year apprenticeship; (3) high school diploma preferred and up to two years on-the-job training, specific work experiences, or training; and (4) less than high school education and workplace training. The new categories are: (1) first professional degree; (2) doctor's degree; (3) master's degree; (4) work experience plus a bachelor's or higher degree; (5) bachelor's degree; (6) associate degree; (7) postsecondary vocational training; (8) work experience in a related occupation; (9) long-term on-the-job training; (10) moderate-term on-the-job training; and (11) short-term, on-the-job training.

Board and cooperating agencies reviewed the occupations included in these categories, and, for this study we have combined them into four levels according to required lengths of training.[11] These levels, along with their projected annual openings, are presented in Figure 3. Note that employment forecasts are sensitive to the overall strength of the economy. A major downturn in the economy would reduce the forecasted levels of demand.

The supply of workers with short preparation (level 3), which includes jobs that require from 1 to 12 months of training, is especially difficult to estimate. Whereas the community colleges and private career schools provide much of this training, employers also do, and there are no reliable estimates for the number of workers receiving such training. In order to have a more meaningful and reliable skill gap analysis, we have focused exclusively on middle-level preparation (level 2); i.e., jobs requiring postsecondary training, which generally last more than one year and up to, but less than, four years. ESD forecasts there will be, on average, about 32,000 net job openings per year for this

FIGURE 3

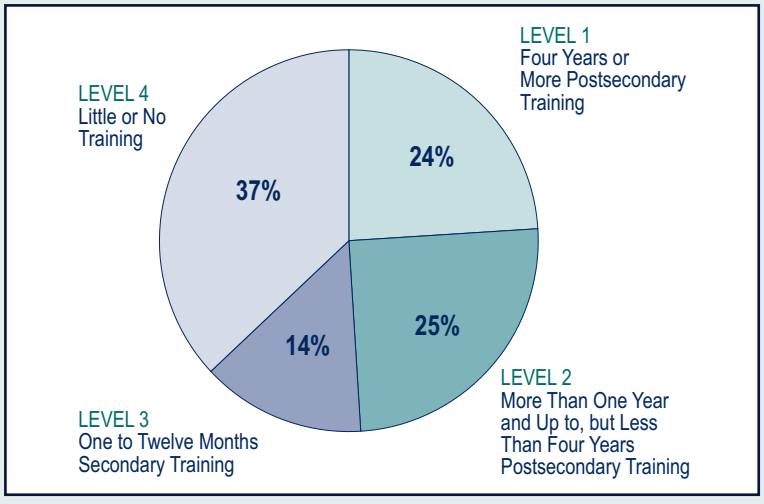
Training Levels	Average Annual Job Openings 1998-2008
LEVEL 1 — *Long preparation* Four years or more postsecondary training*.	30,249
LEVEL 2 — *Middle-level preparation* More than 1 year and up to, but less than, 4 years postsecondary training**.	32,011
LEVEL 3 — *Short preparation* One to twelve months post-secondary training	17,617
LEVEL 4 — *Little preparation* Jobs requiring less than a high school education, a high school diploma, or up to but less than one month of post-secondary training	46,200

*Includes BLS categories 1 through 5. See Footnote 10.

**Includes BLS categories 6 through 9; i.e., jobs requiring an associate degree, postsecondary vocational training, work experience in a related occupation, and long-term, on-the-job training.

FIGURE 4

Training Levels Required for Expected Job Openings Between 1998 and 2008



[11] The State Board for Community and Technical Colleges, the Washington State Employment Security Department, and the Federation of Private Career Schools.

FIGURE 5

Occupations Requiring More Than One Year and Up To, but Less Than Four Years of Postsecondary Education

Top Occupations In Terms of Expected Job Openings In Washington

Number of Annual Net Job Openings

Marketing/Sales Supervisors	1,800
Carpenters	1,300
Clerical Supervisors	1,200
Registered Nurses	1,200
Paraprofessionals & Technicians, NEC*	1,100
Secretaries, Excluding Legal or Medical	1,100
Automotive Mechanics	1,000
Cooks, Restaurant	900
Service Supervisors, NEC*	900
Food Service & Lodging Managers	850
Teachers Aides, Paraprofessionals	750
Hairdressers & Hairstylists	650
Electricians	500
Dental Assistants	500
Health Professionals/Paraprofessionals/Technicians, NEC*	450
Licensed Practical Nurses	450
Police Patrol Officers	400
Medical Assistants	400
Computer Programmers	400
Dental Hygienists	350
Computer Support Specialists	350

*Not Elsewhere Classified

Source: Washington State Employment Security Department, 1999.

group over the next 10 years.[12] Figure 5 provides a list of the top occupations in this group ranked by expected annual job openings.

Unfortunately, ESD does not provide estimates for the number of openings in a particular year. Rather, it estimates the average number of openings over the period from 1998 to 2008. We need estimates for different years in order to gauge movements in the skills gap over time. Annual openings arise from two sources: new jobs created by growth and replacement of workers retiring or otherwise leaving these occupations. Openings from both sources should increase over time. Given a rate of employment growth, the process of compound growth implies that the absolute number of new jobs created each year should increase over the projection period. Moreover, replacement needs should also increase as the population ages, and many in the baby-boom generation begin to retire after 2005. According to ESD's forecasts, total employment in middle-level preparation occupations increases by 1.5 percent a year. We allow annual job openings to increase at this rate and scale them so as to keep the annual average openings at 32,000. This suggests there were about 30,000 annual job openings in 1997-98, and by 2008-09, there should be about 34,000 annual job openings.

[12] ESD only forecasts ten-year averages for net openings. It is probable openings will be somewhat below the ten-year average in some years and somewhat higher in others.

Supply of Postsecondary Vocational Training

When we compare expected job openings per year to the current educational supply, we see that the supply falls substantially short of demand. The supply of workers with the required level of training comes from three main sources: community and technical colleges, private career schools, and apprenticeship programs. We estimate these training providers supplied about 21,700 workers with middle-level preparation to the labor market during 1997-98.[13] (See Figure 6.)

Community and technical colleges supply the following students with middle-level preparation. First, there are graduates from vocational programs that last for one year or more. These students receive vocational associate degrees or certificates. Second, there are graduates who receive terminal academic associate degrees, i.e., students who receive their degree and do not transfer to a four-year college or university. Third, there are vocational and academic students who leave the colleges before finishing their programs but who complete 45 or more credits. The earnings and employment levels of these students suggest many of them have obtained skills that are valued by employers. Note that these 45+ credit leavers make up a substantial share of total supply. (See Figure 6.)

In addition to removing students who transfer to four-year institutions, two additional adjustments were made in order to make the supply estimates as accurate as possible. Students who already had post-secondary credentials at this level or above upon enrolling in the community and technical colleges were not counted. Second, since some former students do not enter or remain in the labor market (for example: they become homemakers or become ill), we adjusted supply figures by the appropriate labor force participation rates.[14]

[13] These are the most recent estimates available because a lag is required in order to observe whether or not graduates from community and technical college programs transfer to four-year institutions.

[14] The labor force participation rates for those aged 20 to 39 with appropriate levels of educational attainment were estimated using data from the *1998 Washington State Population Survey*.

FIGURE 6

Annual Net Additions to Labor Market Supply of Workers with Middle-Level Preparation: 1997-98

COMMUNITY & TECHNICAL COLLEGES	
Vocational Associate Degrees	4,061
Terminal Academic Associate Degrees	3,882
Certificates (programs taking one year or more)	2,005
Vocational Leavers with 45+ Credits	2,319
Academic Leavers with 45+ Credits	3,542
APPRENTICESHIP COMPLETERS	999
PRIVATE CAREER SCHOOLS	
Associate Degrees	1,104
Graduates (programs taking one year or more)	3,183
Cosmetology School Graduates	571
TOTAL	**21,666**

Private career schools provide three groups: graduates with associate degrees; nondegree students that completed programs, which take one year or more to complete; and graduates from cosmetology schools.[15] Again, we adjusted the supply figures for the private career schools and apprenticeship programs for labor force participation.

Together, community and technical colleges, private career schools, and apprenticeship programs prepare about 21,700 workers per year.

When we compare the annual supply in 1997-98 of 21,700 to the number of job openings (29,900), we find an annual skills gap of about 8,200 during the 1997-98 school year.[16]

In addition to the in-state supply of workers, workers move to the state from elsewhere. While net migration can add to the supply of workers with vocational credentials, the overall population of workers who move to the Washington State actually has a lower percentage of individuals with associate degrees than does the resident state population. The opposite is true with respect to individuals with graduate and bachelor degrees. According to Census data, the net effect of migration to and from other states has been to increase the proportion of graduate and baccalaureate workers in the state.[17] Thus, while there is some demonstrated potential for addressing shortages of graduate- and baccalaureate-level workers through in-migration, experience demonstrates more limited ability to import workers at the associate level. (See Figure 7.)

While there are no recent data for net migration among vocationally trained workers, we cannot rely on inmigration alone to close the skills gap.[18] Net migration into Washington has declined dramatically from its peak in 1989-90. The rate is currently around seven per thousand, and it is expected to remain around this level for the next ten years.[19] The scarcity of skilled labor is a national problem, and it will be difficult to attract trained workers from other states. Moreover, the subbaccalaureate labor market is largely local in nature. One consequence of this is that shortage in

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[15] There were 16,007 private vocational school completers in 1997-98. Most of these former students, however, were in programs that lasted for less than one year. Based on a sample of 1,057 completers from 1997-98, we estimate about 23 percent finished programs that took one year or longer to compete.

[16] Our gap analysis conducted two years ago relied on the former BLS occupational skill level classifications. In this study, we focused on occupations that required two to three years of postsecondary training. The 1996-2006 ESD occupational forecasts available at that time projected 38,000 annual openings for this group. Our supply estimates for this training level suggested a skill gap of about 15,000. If the former BLS classifications are applied to the more recent ESD forecasts for 1998-2008, the projected number of openings for jobs requiring 2 to 3 years of postsecondary training increases to 38,800. Moreover, the estimated supply, using the same methodology as two years ago, actually falls, and the estimated gap would be larger.

[17] Academic associate degree workers show no proportional inflow. Vocational certificate workers are not identifiable in Census data.

[18] Adjusting 1990 Census data for current net migration rates suggests net inmigration adds roughly 1,400 workers with vocational associates degrees to Washington's labor market each year.

[19] Washington State Office of Financial Management and Washington State Employment Security Department, "1999 Long-Term Economic and Labor Force Forecast for Washington," 1999.

specific occupations can persist because it is difficult for wage mechanisms to lure trained workers from other areas.[20]

Employer responses to our 1999 survey, *Workforce Training Needs and Practices of Washington State Employers*, provide additional evidence of the severe scarcity of workers with postsecondary vocational training. An estimated 60,000 employers, or 64 percent, had difficulty finding qualified job applicants during the past year. The scarcity of workers with postsecondary vocational training affects more firms than are affected by shortages of other workers—19,000 firms had difficulty finding workers with a vocational diploma or certificate, and 13,545 had difficulty finding workers with a vocational associate degree. When duplicate counts of firms that had difficulty at both levels are removed, we estimate that 24,000 firms had difficulty in finding workers with either vocational certificates or vocational associate degrees.

Employer responses also suggest that the scarcity of skilled labor will become more severe in the future, unless supply increases substantially. Forty-seven percent of firms reported that the skills required to adequately perform production or support jobs have increased. Thirty-six percent of firms expected their needs for workers with vocational diplomas and certificates to increase during the next five years.

[20] W. Norton Grubb, Torry Dickinson, Lorraine Giordano, and Gail Kaplan, *Betwixt and Between: Education, Skills, and Employment in Sub-Baccalaureate Labor Markets*, University of California at Berkeley, National Center for Research in Vocational Education, December, 1992.

Demographic Change and Closing the Skill Gap

We estimate Washington's community and technical colleges, private career schools, and apprenticeship programs supplied almost 21,700 workers with middle-level preparation to the labor market during 1997-98. If current age-specific participation rates in the various programs were maintained, would projected demographic changes increase the supply of trained workers by enough to close the gap? The answer is "no."

FIGURE 7

Educational Composition of Net Migration and Nonmigration Population for Washington State
(based on 1990 Census)

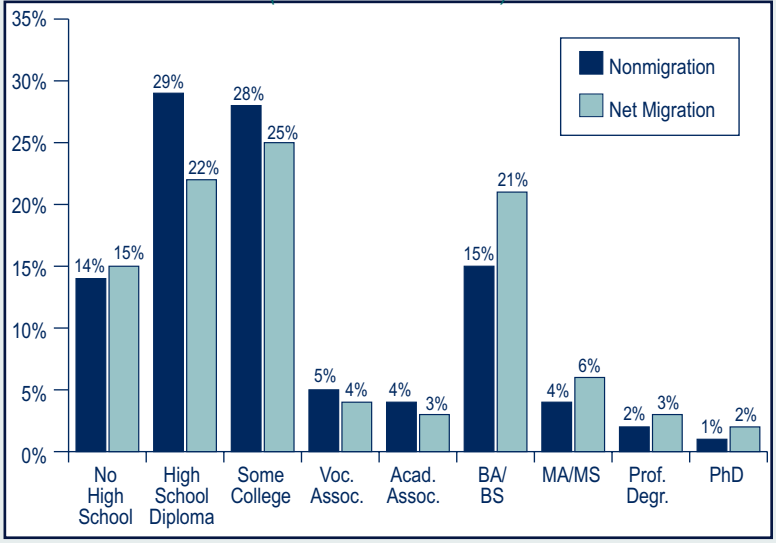


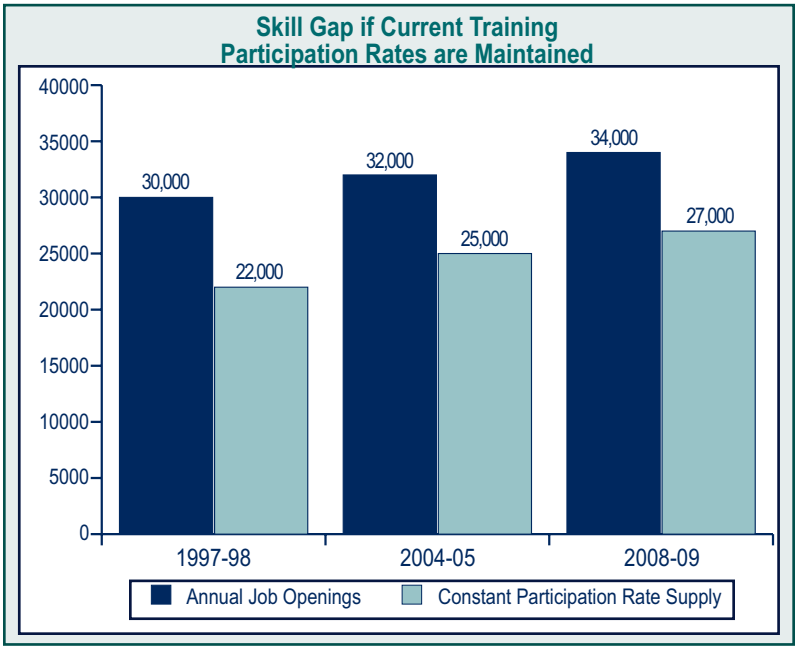
FIGURE 8

Projected Supply* and Demand of Workers With More Than One and Up to, but Less Than, Four Years of Postsecondary Training

	1997-98	2004-05		2008-09	
	NUMBER	NUMBER	ANNUAL GROWTH RATE **	NUMBER	ANNUAL GROWTH RATE
Community & Tech. Colleges					
• Vocational	8,400	8,700	0.5%	9,100	1.3%
• Academic	7,400	10,500	6.0%	11,400	2.1%
Private Career Schools	4,900	5,100	0.7%	5,400	1.5%
Apprenticeship	1,000	1,000	0.7%	1,100	1.4%
Total Supply	21,700	25,300	2.4%	27,000	1.7%
Annual Job Openings	29,900	32,200		34,200	
Estimated Skill Gap	8,200	6,900		7,200	

* Supply is projected by assuming that current participation rates in training programs are maintained.
** Numbers are rounded to the nearest hundred. Growth rates are estimated using numbers that are not rounded.

FIGURE 9



If we assume that the supply of skilled workers from community and technical college programs, apprenticeship programs, and private career schools grow at rates that maintain current participation rates, as discussed earlier, the total supply of workers with middle-level preparation grows to about 25,000 by 2004-05 and 27,000 by 2008-09. (See Figure 8.)

According to our estimates, annual openings for workers with middle-level preparation currently exceed supply by roughly 8,000 workers. If constant participation rates are maintained, the skills gap would narrow to around 7,000 by the 2004-05 school year. (See Figure 9.)

Maintaining current participation rates in the various training programs will not close the skills gap. Moreover, given the projected demographic trends, maintaining these rates would substantially alter the composition of the annual supply of workers with middle-level preparation. Community and technical college academic students currently account for 34 percent of this supply. Their share increases to 42 percent by 2004-05 because of very rapid expected growth in the population of 18- to 22-year-olds. Academic students account for over 80 percent of the growth in total supply up to 2004-05 and for just over half the growth between 2004-05 and 2008-09. (See Figure 10.)

These students typically have good critical thinking and problem-solving skills, which are valued by employers. However, they do not have occupational skills preparation, and our employer survey results suggest the most severe shortages are in this area.

Employers are most likely to report difficulty in finding applicants with the required job-specific skills. Moreover, the scarcity of workers with postsecondary *vocational* training affects more firms than are affected by shortages of other workers.

Strategies to Meet the Gap

Increasing Community and Technical College Vocational Training

Maintaining current participation rates will not increase the supply of workers with middle-level preparation by enough to meet demand. We recommend the gap be closed by increasing the number of FTEs devoted to job preparatory programs at the community and technical colleges beyond current participation rates.

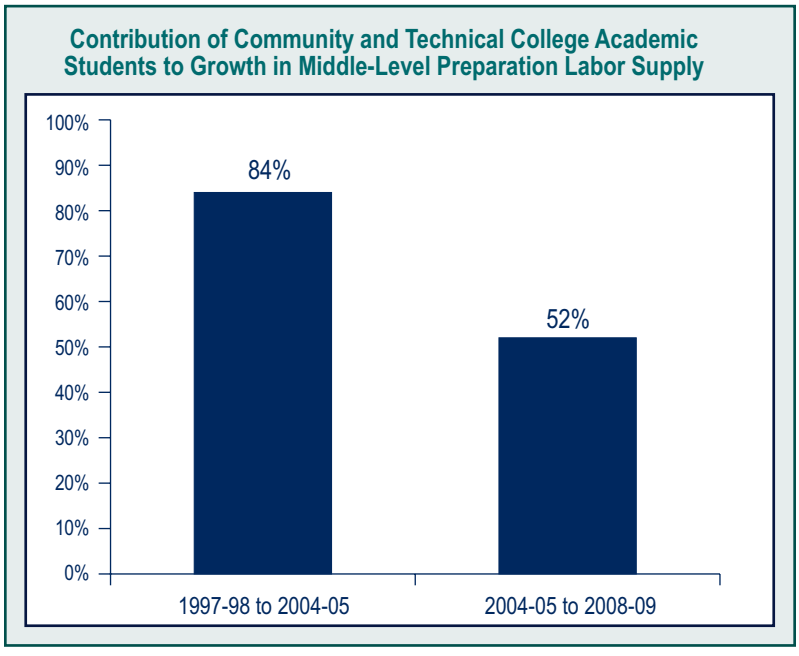
The required annual increase in job preparatory FTEs depends on two critical factors: how soon the gap is closed and the extent to which the community and technical colleges can increase efficiency in the production of appropriately trained workers. Efficiency refers to the number of FTEs required to supply the labor market with an additional trained worker.

During the 1998-99 school year, colleges had 36,301 job preparatory FTEs. To achieve training targets that it established, SBCTC anticipates 38,000 job preparatory FTEs in 2000-01. The bulk of these, about 32,000, are associated with providing middle-level training (i.e., students who enroll in programs lasting one year or longer), and the remainder support shorter term training programs.

If there are no efficiency gains, closing the gap will require an additional 21,300 FTEs in 2008-09 over the 38,000 anticipated in 2000-01. If this goal is to be achieved, reaching the number of FTEs needed by 2008-09 will require adding roughly 2,700 job preparatory FTEs per year beginning with the 2001-02 school year.

It should be noted these numbers do not refer to the total number of student FTEs at the community and technical colleges. The numbers do not include increases in student FTEs to fulfill the academic transfer or basic skills missions of the colleges. They also do not include FTEs associated with growth in shorter-term job preparatory program enrollments beyond those suggested by demographic change.

FIGURE 10



Projections are based on the following analysis.

There will be an estimated 34,000 job openings in 2008-09 requiring postsecondary vocational training. If current participation rates are maintained, the supply of training will increase to 27,000. Of this 27,000, about 9,000 workers would be prepared through job preparatory training at community and technical colleges. Closing the gap between 34,000 job openings and a supply of 27,000, would require preparing an additional 7,000 new workers. If job preparatory training at community and technical colleges were increased to provide these workers, it would require 7,000 more workers prepared through job preparatory training in addition to the supply of 9,000, which would be achieved through maintaining current participation rates alone. The total number of workers be prepared through job preparatory training would, therefore, need to be about 16,000.

The number of newly prepared workers that would be needed is 16,000. It takes more than one FTE student to produce one prepared worker. This is largely because some students leave without completing 45 or more credits (the threshold for counting a student as contributing to the supply of prepared workers), and many students take remedial classes that add to their FTE count. It currently takes 3.23 student FTEs to produce 1 worker prepared for the labor market.

To calculate the total number of job preparatory FTEs needed, we multiply 16,000 prepared workers times 3.23 FTEs needed per prepared worker and obtain an estimated 52,600 student FTEs required for middle-level training.* This represents a 20,600 increase over the anticipated 32,000 FTEs devoted to middle-level training in 2000-01. Including the FTEs devoted to shorter-term training, based on current participation rates, brings the total job preparatory FTEs needed in 2008-09 to 59,300.**

*FTE figures are rounded to the nearest hundred. This explains why 16,000 times 3.23 does not exactly equal 52,600. Note, these 52,600 FTEs do not include students in short-term, job preparatory programs.

**Maintaining current age-specific service levels for shorter-term job preparatory programs suggests there would be roughly 6,700 FTEs in these programs during 2008-09.

An increase of 2,700 job preparatory student FTEs per year is a very substantial increase, especially in light of the fact that job preparatory FTEs have not increased over the past 4 years. (See Figure 11.) The ability to attract enough students to vocational programs is likely to be a major factor constraining future growth in FTEs. Policies that increase the incentives for students to enroll in vocational programs such as special financial assistance should be considered.

As mentioned earlier, the required annual increase in job preparatory FTEs depends on how soon the gap is to be closed ***and*** the extent to which the colleges can increase efficiency in the production of trained workers. Figure 12 examines this relationship. We present the annual FTE increases that would be required to close 50 percent, 75 percent, and 100 percent of the gap by 2008-09. We also present the impact of reducing the FTE/worker ratio by 10 percent.

There are a number of ways in which efficiency can be improved. For example, colleges are implementing skill standards and career ladders that can shorten the time it takes for students to obtain industry-recognized credentials. Tech-prep and Running Start are increasing the number of college credits obtained by students while they are still in high school. And, K-12 educational reform should reduce the need to take remedial courses in college. As a result of these changes, in the future students will need to spend less time at college before they are prepared for the workforce.

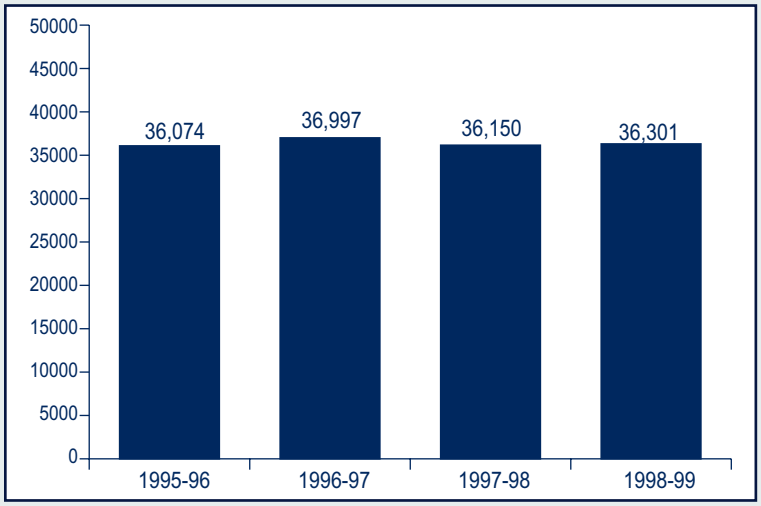
As can be seen in Figure 12, a 10 percent improvement in efficiency would reduce the number of additional FTEs needed per year in order to close the gap by 2008-09 from 2,700 to 2,000.

Finally, if the state were to close only part of the skills gap by 2008-09, this would obviously reduce the annual increase required in job preparatory student FTEs. If only half of the gap were closed by 2008-09, and there were no changes in efficiency, 1,200 additional job preparatory FTEs would be needed per year.

State funding per community and technical college student FTE is currently $3,943. If this funding level is maintained, an annual increase of 2,700 FTEs would cost the state an additional $10,646,100 per year. An increase of 1,200 would cost $4,731,600. (This does not include any additional funds required for student financial aid.)

FIGURE 11

Community and Technical College Job Preparatory FTEs



Note: Includes enrollments not funded by the state. Excludes skill upgrade students, international students, and students taking only basic skills courses.

Apprenticeship

Closing the skills gap will also require substantial increases in the numbers completing apprenticeship programs. A study conducted by the Office of Port JOBS; the Worker Center of the King County Labor Council, AFL-CIO; and the Northwest Policy Center found demand for construction workers in Puget Sound will increase rapidly, putting pressure on the region's apprenticeship and apprenticeship preparation systems. Increased construction activity, higher than average retirements, and other replacement needs are expected to result in roughly 5,340 net job openings (new jobs and openings due to replacement)

FIGURE 12

Annual FTE Increases Required to Close the Postsecondary Vocational Skills Gap Under Different Assumptions

Percentage of Gap Closed by 2008-09	Extent of Efficiency Gain (percent reduction in FTE/worker ratio)	
	NONE	**10 PERCENT**
100%	2,700	2,000
75%	1,900	1,400
50%	1,200	700

per year up to mid-2001, and about 4,125 per year from 2001 to 2006. These openings are not fully captured in the ESD estimate of job openings discussed earlier.

The study concluded that the Puget Sound region's apprenticeship programs, which combine structured, on-the-job training with classroom instruction, must be expanded to meet the growing demand for skilled workers. The 11 largest programs serve about 3,500 apprentices each year and could, with additional resources such as more classrooms, serve another 1,500. However, it will be hard to find enough qualified applicants for the programs. One problem is the system's decentralized nature, which can make it difficult for an interested person to understand and navigate. Other problems include insufficient linkage between apprenticeship preparation programs and apprenticeships, difficulties in recruiting and retaining women, insufficient marketing of apprenticeship programs in high school, and a cultural bias against entering trades.

Demand for Upgrading the Skills of the Current Workforce

In addition to new workers with vocational skills and degrees, employers also need to provide continuing education and training for their current workers so skills stay up-to-date and competitive.[21] Similarly, workers wish to upgrade their skills to qualify for higher level jobs.

Workforce skill upgrading for any given worker is likely to consist of:

- Repeated instances of formal training, consisting of a program or course of training (termed an "episode" in this report), often in a classroom-type setting.
- More frequent employer-provided formal on-the-job training.
- Continual informal learning on the job.

Most of the available data is about the first of these three types of skill upgrading.

Employers surveyed for the Workforce Board were asked to estimate the proportion of their workers in need of further classroom training to increase productivity such as might be obtained at a local community college or private vocational school. Based on the responses, approximately 600,000 persons, or 21 percent, of the current workforce needs additional classroom training.[22] Results are supported by data from surveys of former students.[23]

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[21] Analysis of training needs in this report focuses on classroom training, in part, because of the substantial public sector role in this area. The employer survey questions used in estimating demand clearly referred to enrollment, courses, and type of training provided by community and technical colleges. Therefore, the demand and supply for employer-provided, nonclassroom training is properly excluded from analyses based on those surveys.

[22] The survey did not cover workers who are employed by firms with fewer than two employees or federal government workers. The survey also did not include individuals who are unemployed or temporarily out of the workforce. Workforce turnover, including migration and replacement of retirees with younger workers, will also add to the number of workers needing skills upgrading.

[23] When surveyed in the fall of 1999, 77 percent of community and technical college vocational students who left school in 1997-98 indicated a substantial interest in additional training.

Taking the employers' estimates of the needs for the current workforce as a starting point, some idea of the approximate supply and demand can be constructed. However, not all of the needs identified by employers will be met in a single year. If training to meet current identified needs is spread over a 3-year period, these figures taken together indicate a demand for retraining or upgrading the skills of roughly 200,000 current workers per year. Following demographic forecasts, that need will rise by more than 1.6 percent per year as the adult population grows, even if there were no increase in the rate of changing skill requirements.

As we've noted before, however, a significant factor in the need for upgrading is the continued growth and change in the use of computer technology, which results in a demand for both initial qualifications and repeated upgrading of skills. Employer responses indicate nearly half (45 percent) of all nonsupervisory jobs now involve the use of computers.

At present, community and technical colleges and private career schools supply about 109,000 completed training episodes per year.[24] This estimate is based on the number of students who were working while enrolled, excluding those who reported they enrolled only for personal interest.

Private vocational schools enroll approximately 35,000 students in degree and nondegree programs and provide approximately 25,600 completed training episodes per year. However, it is not known how many of these students were working while they were in school.

In addition, many vendors who are not licensed schools provide short-term training classes in a wide range of skills and specialties. For example, a great deal of software training is carried out in this way. No reliable estimates exist for the amount of this training.[25]

This rough estimate indicates a substantial gap between an estimated demand for classroom training (about 200,000 incumbent workers per year) and the present supply of roughly 109,000 training episodes. This gap will be particularly important over the next ten years as the baby boom echo sharply increases the number of young adults in the prime training ages, and employers need to replace the skills of the first wave of retiring baby boomers. As noted, any increase in the rate at which skill requirements change will widen this gap. Because of the imprecision of these estimates, this report makes no precise forecast of the shortfall in capacity for worker skill upgrading.

Incumbent Worker Customized Training

Most workers upgrading their skills pay the tuition cost themselves, although many employers offer tuition assistance to their employees. Forty-seven states have

[24] A training "episode," as used here is any amount of formal classroom training. It might be best thought of as a class, course or program, or a group or sequence thereof taken simultaneously or consecutively.

[25] The wording of the Workforce Board survey questions is likely to have excluded much of this training in the responses received.

programs that pay some of the cost of customized employee training designed to meet specific employer needs. The Job Skills Program is our state's program designed to provide customized employee training for particular employers and job openings. The Job Skills Program can provide training for new hires, skills upgrading of current workers when it will result in job growth, and retraining to prevent layoffs. The vast majority of this training is conducted at community and technical colleges and is, therefore, included in the FTE and enrollment counts above. In the 1997-99 biennium, the program trained 1,585 workers. Forty percent of the trainees were incumbent workers and the rest were new hires.

Training customized to meet the needs of a particular employer can also be delivered through other programs. These other programs include the Worker Retraining Program and, beginning on July 1, 2000, Title I-B of the Workforce Investment Act. Community and technical colleges supply customized training to employers that contract to pay the entire cost of the training. However, JSP is the only state-funded program with employer-customized training as its primary purpose, and the Worker Retraining program can only provide training for certain categories of individuals.

JSP funding for the most recent program year (July 1999 to June 2000) was $568,000. Total grants were $840,988 from July 1997 through June 1999. On a per capita basis, funding remains the lowest among the 47 states that fund customized training.

Dislocated Workers

Despite the expanding economy, dislocation of workers due to economic restructuring continues. ESD estimates there were about 58,000 dislocated workers in Washington in 1999. This number is expected to increase over the next 5 years, reaching 65,650 by 2002 and almost 70,000 by 2005.[26] (See Figure 13.)

Based on federal Current Population Survey data for Washington for the last business cycle, the number of dislocated workers can double during a recession. Inevitably, another downturn in the business cycle will occur sometime in the future. At that time, based on past experience, we can expect a large increase in the number of dislocated workers from the present time.

The ESD forecast and the Current Population Survey data give us an approximate idea of the number of dislocated workers. Not all dislocated workers, however, seek government assistance in finding

[26] Labor Market & Economic Analysis Branch, Employment Security Department, April 2000.

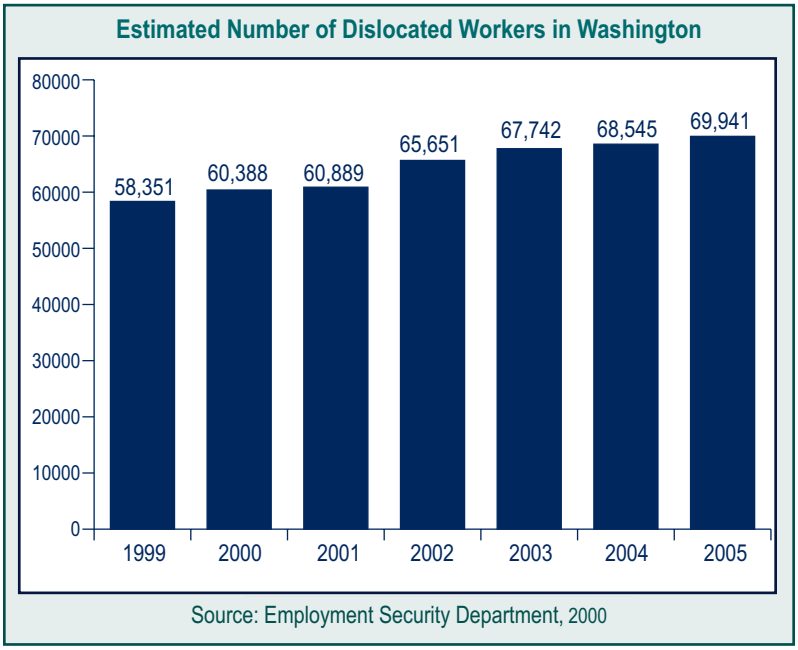
reemployment. The demand for retraining and other services is less than the total number of dislocated workers.

Dislocated workers are primarily served through two programs: the Worker Retraining Program (ESHB 1988) and JTPA Title III (replaced by WIA Title I-B on July 1, 2000). Precise counts of the numbers served are very difficult because programs coordinate services to some of the same individuals, the definition of dislocated worker varies between programs, and because eligibility for some programs includes persons who are not dislocated workers. Also, some dislocated workers receive training services without help from targeted programs with combinations of private resources and generally available public programs such as Pell grants.

During the period from July 1998 to June 1999, 6,085 dislocated workers enrolled in the JTPA Title III Program, and 5,140 enrolled in the Worker Retraining Program.[27] Altogether, a total of almost 9,700 dislocated workers enrolled in one or both of these programs after controlling for co-enrollments. This number does not include dislocated workers who were served by other programs, such as trade adjustment assistance or those taking courses at community and technical colleges who were not in the Worker Retraining Program.

In the winter of 2000, the Legislature enacted a new additional unemployment insurance benefits program for certain dislocated workers while they are in approved retraining programs. This program will greatly increase the financial help available to dislocated workers. In addition, the Department of Labor makes available national reserve grants that are used to enhance the state's core ability to serve dislocated workers.

FIGURE 13



[27] These are the numbers enrolling in the programs during this period, rather than the total number of program participants. The number of program participants is greater since participation often lasts for more than one year.

Adults With Barriers to Employment

This section of the report analyzes the workforce training supply and demand for two major groups of adults with barriers to employment: the economically disadvantaged (who generally lack work experience that employers seek in new hires) and adults lacking in basic skills. Some individuals have multiple barriers and may, therefore, be included in both of these groups.

Economically Disadvantaged

Based on the *1998 Washington State Population Survey*, about 536,000 people aged 18 to 65, or 15 percent of adults in the state, have household incomes below 175 percent of the poverty line. Twenty percent of these adults lacked a high school diploma or GED, and fifty-five percent had no postsecondary education. About one-third lived in households receiving public assistance (Temporary Assistance to Needy Families [TANF] or Food Stamps). Fifty-eight percent were working for pay during the week of the survey, and one quarter were enrolled in school. Among those working, over one-third were concentrated in sales, clerical, and food preparation jobs.

Supply of Training

The following list estimates present education and training services for economically disadvantaged adults.

- Financial aid for about 28,150 disadvantaged students at community and technical colleges. Some of these students also received support services from JTPA or TANF.
- Training without financial aid for 11,300 welfare and former welfare students at community and technical colleges.
- Classroom training by other providers through JTPA, including tuition support for 3,750 individuals.[1]
- On-the-Job Training through JTPA for 927 individuals.
- Other training or experience to enhance workplace or basic skills for about 3,300 JTPA participants.[2]
- Workforce-related General Educational Development certificate (GED), English-as-a-Second-Language (ESL), and Adult Basic Education (ABE) programs at community and technical colleges and community-based organizations that report to the Office of Adult Literacy for over 20,500 individuals not counted in the above categories. (Nonwork-related literacy services at community and technical colleges were provided to over 24,000 individuals.)

[1] This report is based on JTPA programs in place during the time period July 1, 1998, to June 30, 1999. On July 1, 2000, WIA replaced JTPA.

[2] Besides education and training, JTPA provides other services such a job search assistance and support services.

In addition, economically disadvantaged adults receive a significant share of the benefits from the following programs.

- Need-based financial aid at public four-year colleges and universities for 40,800 individuals.
- Education at public four-year colleges and universities without financial aid.
- Need-based financial aid at private 4-year colleges and universities for 17,600 individuals.
- Need-based financial aid while attending private career schools for 8,400 individuals.

Unknown numbers of the economically disadvantaged pay for training entirely on their own or are provided training by their employers or through nonprofit funding sources.

A significant number of individuals are double counted in this list because they receive more than one of these services during the year. Many individuals also receive other types of employment-related services, such as job search and placement assistance, through JTPA or other programs.

Support services are important to enable disadvantaged adults to participate in vocational training. Such services include income support and child care. Regular and extended unemployment benefits, Pell grants, TANF, and the Worker Retraining Program (ESHB 1988) are all important sources of income support for those engaged in training. Several programs, notably JTPA, Worker Retraining, and TANF/WorkFirst, provide childcare funding.

Changing Supply

It is unclear how many disadvantaged adults should be served by the workforce development system each year. Some unknown number of disadvantaged adults will pass out of temporary hard times without additional assistance beyond unemployment compensation, public assistance benefits, and job information. Others, particularly younger adults, are temporarily poor while participating in education or training. It would be unreasonable to expect to serve the entire existing population of economically disadvantaged adults in a single year, taking care of the backlog all at once. Simply providing a service to one household member during the year is often insufficient to boost a household out of low-income status. Nor do all of those who are economically disadvantaged want to take part. On the other hand, while many people leave low-income status every year, additional people will be added to the low income adult population as they age into the workforce, suffer declining circumstances, or migrate from other states or nations. Existing research is inadequate to quantify all of these factors.

Policies to expand the general availability of training (e.g., expansion of community and technical college enrollment) will benefit significant numbers of the economically disadvantaged if accompanied by the expansion of financial aid. In addition, increased training for populations that

overlap with the disadvantaged (e.g., training for out-of-school youth or dislocated workers) will also benefit many individuals who are disadvantaged.

There is a clear need to continue to increase the skills of the economically disadvantaged through vocational training. It is difficult, however, to set firm targets for changing the supply of training for the disadvantaged given the lack of better evidence on actual demand.

Adults Lacking in Basic Skills

Demand

In 1992, Washington administered the State Adult Literacy Survey (SALS), a performance-based skill assessment, to a sample of the state's adult population. According to SALS, there are between 200,000 and 500,000 adults who are deficient at the most basic skill level tested (level 1). (An estimated 200,000 would get a failing grade on the lowest level test section, while 500,000 would fail at least one question.) At level 1, many adults are unable to respond to much of the survey. Others can perform simple, routine tasks involving brief texts. For example, some can total an entry on a deposit slip, locate the time and place of a meeting on a form, and identify a piece of specific information in a brief news article.

Adult Basic Skills Education

Community and technical colleges provide a substantial amount of work-related Adult Basic Skills Education, ESL and GED training, serving about 19,500 persons per year. (Work-related basic skills does not include instruction intended solely for personal enrichment.) Community-based organizations that report to the Office of Adult Literacy serve about 900 persons per year in related literacy programs. This does not count either basic skills education provided as a subsidiary part of JTPA programs or developmental programs to prepare students for college level work. There are also significant amounts of workplace literacy activities provided by employers. Six percent of employers offer classroom basic skills instruction to some employees.

Major changes in K-12 education or changes in interstate or international migration could affect the demand for basic skills education.

Limited English Proficiency

Based on the 1990 Census, approximately 60,000 adults (ages 19-64) in the state report they do not speak English "well." The 1998 Washington State Population Survey suggests that about 126,000 adults live in households where English is not the primary language spoken.

Approximately 11,350 people per year participate in workforce-related ESL instruction, in programs that report to the Office of Adult Literacy. Virtually all of those reported are in programs at community and technical colleges. This does not count ESL education included as a subsidiary part of either occupational programs at community and technical colleges or JTPA programs. Community-based organizations also receive funding to provide ESL services under Refugee Assistance and Adult Immigrant Education programs. It is not possible to accurately forecast future demand for ESL services due to uncertainty about future levels of immigration. However, significant demand for these services will likely continue.

General Educational Development Certificate

In 1999 almost 22,000 Washingtonians took all or part of the GED test, and almost 14,000 were issued GED credentials. Three quarters of all GEDs are granted to persons under the age of 25.

Analyses of demographic and educational forecasts do not provide any indication of a major shift in the role or function of the GED in education and workforce training.

Even Start Program

Even Start is a state and federally funded family support program for parents with educational attainment scores below the eighth-grade level and children who are at risk of school failure. Even Start serves approximately 500 adults in Washington each year. In addition to parenting sessions, parents take ABE, ESL, or GED preparation courses.

Increasing Supply

It is unknown exactly how many people are served per year by all the adult literacy programs in the state. Besides the programs discussed here, there are programs provided by the Department of Social and Health Services, the Department of Corrections, and by other state agencies. A 1992 study at the University of Washington estimated that there are over 60,000 participants per year in public adult literacy programs,[3] including programs that are not work-related.

Currently, community and technical college programs and community-based organizations that report to the Office of Adult Literacy reach over 20,500 students per year with a combination of work-related ABE, ESL, and GED courses, using about 4,850 FTEs per year.[4]

[3] "Adult Basic Skills Instruction Services and Needs in Washington," William Zumeta, 1992.

[4] Most of these students, 19,650, were served by the community and technical colleges.